PATENT
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:	)	
	)	
John M. Marynowski *et al.*	)	Confirmation No.: 7919
	)	
U.S. Application No.: 09/417,774	)	Group Art Unit: 3624
	)	
Filed: October 14, 1999	)	Examiner: D. Felten
	)	
For: AN AUTOMATED TRADING SYSTEM IN AN ELECTRONIC TRADING EXCHANGE	)	**MAIL STOP APPEAL BRIEF PATENTS**

Commissioner for Patents
Arlington, VA 22202

Sir:

APPELLANTS' BRIEF UNDER 37 C.F.R. § 1.192

This brief is in furtherance of the Notice of Appeal filed October 7, 2003, in connection with the above-identified application, and appealing the final rejections of claims 27-46 by the United States Patent and Trademark Office in a final Office Action dated August 13, 2003. The fee required under 37 C.F.R. § 1.17(c) is being filed concurrently herewith. This brief is transmitted in triplicate.

1. **THE REAL PARTY IN INTEREST**

The real party in interest in this appeal is Edge Capture, LLC.

2. **RELATED APPEALS AND INTERFERENCES**

Appellants are not aware of any other appeals or interferences that will directly affect, will be directly affected by, or will otherwise have a bearing on, the decision in this appeal.

3. STATUS OF THE CLAIMS

The status of the claims is as follows:

Claims canceled: None.

Claims withdrawn from consideration but not canceled: None.

Claims pending: 1-46.

Claims allowed: 1-26.

Claims rejected: 27-46.

Claims appealed: 27-46.

4. STATUS OF AMENDMENTS

All amendments have been entered. A copy of the rejected claims is attached as an Appendix to this brief.

5. SUMMARY OF THE INVENTION

The present invention relates to an automated trading system and method operating in an electronic exchange system. By way of background, electronic exchange systems use communications networks and computers to replicate traditional face-to-face exchange functions of buying and selling stocks, bonds, currencies, commodities, and other items. *(p. 2, 9-15).* Centralized exchange computers disseminate market information and match trades, among other tasks. *(p. 2, 15-17).* Matching of trades is done electronically, typically on a first-come/first-served basis. *(p. 2, 17-19).* Accordingly, the time of order entry is an important criterion for determining priority in fulfillment of a transaction. *(p. 2, 17-19).*

Trader stations typically rely upon the traders themselves to decide whether to submit an order in response to a trading opportunity presented through the exchange. *(p. 2, 27-28).* In this regard, the trading information is received from the exchange, processed, and displayed on a

monitor of the trader's station. *(p. 2, 28-30).* The trader reads the trading information from the monitor and decides whether or not to submit an order (e.g., a request to buy or sell a traded item at the ask or bid price or a price quote corresponding to the ask or bid price of the traded item). *(p. 2, 30 – p. 3, 1).* The trader then submits an order by entering instructions into the trader station using a keyboard or mouse. *(p. 3, 1-2).* In response to the order, the electronic trading exchange system computers match buy and sell orders on a first-come/first-served basis. *(p. 2, 17-18; p. 8, 17-18).* The speed and accuracy of submitting orders or other responses is critical to the trader's ability to participate in the most profitable transactions. *(p. 8, 18-20).* Even short delays in response may freeze a trader out of an otherwise lucrative transaction. *(p. 8, 20-21).*

The present invention is directed to an automated trading system and method in an electronic exchange system network that reduces the time it takes to submit an order in response to incoming trading information from the exchange. *(p. 8, 22-23).* In accordance with one aspect of the present invention, the trader's computer equipment automatically decides whether or not to submit an order based upon a look-up table of trading information stored by the computer equipment and trading information received from the exchange computers. *(p. 8, 23-26).* More particularly, the automated trading system of the present invention utilizes a precalculated table of theoretical prices over a range of one or more variables that affect theoretical price. *(p. 18, 17-19).* Accordingly, when a variable affecting theoretical price (such as the market price of the underlying security) changes, the automated trading system references a new theoretical price in the theoretical price look-up table and uses the new theoretical price in deciding whether to buy or sell a traded item. *(p. 18, 19-22).*

Figure 1 (reproduced below) provides a schematic of an exemplary embodiment of an electronic trading exchange system network 10 that may be used in connection with the present

invention. *(p. 9, 16-17).* Other network arrangements may be used as well. *(p. 9, 17-18).* For purposes of simplification, Figure 1 illustrates an exchange site 100 linked to a single trading site 200 by one or more communication links 300. *(p. 9, 19-20).*

The exchange site 100 may be designed as a local area network (LAN) and include, for example, one or more security routers 111, 112 and one or more back office computers 130-1, 130-2, and 130-3, among other equipment. *(p. 10, 4-6).* The security routers 111, 112 control communications between the back office computers 130 and the communications links 300. *(p. 10, 8-9).* The back office computers 130 manage the trading of the various securities. *(p. 10, 15-17).* For example, one or more of the back office computers 130 may maintain order books, perform order matching, and generate market information for use at the exchange site 100 and for transmission over the communication links 300. *(p. 10, 17-22).*

The trading sites 200 may include a LAN architecture having one or more security routers 211, 212; one or more backend computers 220, 225; one or more trader stations 230-1, 230-2, 230-3; and one or more hubs 240, 241, among other equipment. *(p. 11, 1-5).* The security routers 211, 212 transfer trading information between the trading site 200 and the exchange site 100 and screen communications from unauthorized sources. *(p. 11, 5-7).* The hubs 240, 241 distribute data between the backend computers 220, 225 and the trading stations 230. *(p. 11, 7-8).* Backend computers 220, 225 may be equipped with software and/or hardware that facilitates communications with the exchange site. *(p. 11, 15-16).* In addition, backend computer 225 may be configured to perform automated trading functions under the control of one or more of the trader stations 230. *(p. 11, 19-20).* The backend computer 225 should be equipped with a high-speed processor and sufficient memory to efficiently handle automated

trade processing. *(p. 11, 21-23).* The trader stations 230 may control backend computer 225 remotely through a communication link 250, for example, a WAN. *(p. 11, 23-24).*

Figure 2 illustrates an alternative embodiment of an electronic trading exchange system network 20 in which includes an automated trading system computer 225-2 separate from the backend computer 225-1. *(p. 12, 24-27).* In this embodiment, the automated trading system computer 225-2 performs automated trading system functions and the backend computer 225-1 manages communications between the automated trading system computer 225-2 and the exchange site 100. *(p. 12, 27-30).*

Figure 3 (reproduced below) provides a functional diagram illustrating the operation of an embodiment of an automated trading system used in connection with options trading. *(p. 13, 6-7).* The automated trading system is preferably resident in the backend computer 225 as configured in Figure 1. *(p. 13, 10-12).* However, it may also be resident in one or more of the trader stations 230 or the backend computers 220. *(p. 13, 12-13).* The automated trading system software may run in a text-based environment or a Windows or Windows-like environment. *(p. 13, 13-14).* Local decision-making times are reported in the specification. *(e.g., p. 13, 16-21; p. 28, 4-12).*

The embodiment of the automated trading system illustrated in Figure 3 includes a receiver interface 410, option look-up protocol 420, option look-up table 430, underlying price look-up protocol 425, theoretical price look-up table 435, trader station interface 440, decision logic 450, safety check logic 460, order creation logic 470, and output interface 480. *(Fig. 3).*

The automated trading system receives and decodes current market information broadcast from the exchange site 100 through the receiver interface 410. *(p. 13, 22-24).* The current market information may include information related to the options, such as market bid, ask and

last prices. *(p. 13, 26-28).* Option look-up protocol 420 is used to locate the particular option identified in the current market information in option look-up array or table 430, which may be formed in memory of the backend computer 225. *(p. 13, 32 – p. 14, 5).* Communications between the automated trading system and the trader stations 230 are conducted through trading station interface 440. *(p. 14, 20-22).* For example, a trader station 230 may update information contained in the option look-up table 430 via trading station interface 440. *(p. 14, 22-23).* In this way, the option look-up table 430 may be updated to enable (disable) automated trading for a particular option. *(p. 14, 23-24).*

In addition to the current market information concerning options trading, the automated trading system may receive and decode current market information concerning the security (or securities) underlying the options. *(p. 15, 3-5).* The automated trading system may receive the underlying market information, for example, from the exchange site 100, from a separate exchange site, or from another market feed either directly or indirectly, e.g., through a trader station 230. *(p. 15, 7-10).* The underlying market information for a given security may be indexed in the theoretical price look-up array or table 435, which may be formed in the memory of backend computer 225, to identify theoretical buy and sell prices for options associated with the underlying security. *(p. 15, 10-13).* The theoretical price look-up table 435 may be updated by a trading station 230 via trading station interface 440. *(p. 15, 16-17).* In one embodiment of the invention, the current market price of the underlying security is used to index the theoretical price look-up table 435. *(p. 15, 17-18).*

The theoretical buy and sell prices for derivatives, such as options, may be determined using mathematical models. *(p. 15, 20-21).* The mathematical models produce a theoretical value for an option given values for a set of variables that may change over time. *(p. 15, 21-22).*

In addition, the trader selects a buy spread and a sell spread. *(p. 16, 24-25).* The buy spread may be subtracted from the theoretical value to produce the theoretical buy price – the highest price at which the trader is willing to buy a particular option using automated trading. *(p. 16, 25-27).* The sell spread may be added to the theoretical value to produce the theoretical sell price – the lowest price at which the trader is willing to sell a particular option using automated trading. *(p. 16, 27-29).* Accordingly, the trader would like to sell an option having a bid price that is the same as, or higher than, the trader's theoretical sell price. *(p. 16, 29-30).* The trader would like to buy the option from anyone offering a price that is the same as, or lower than, the trader's theoretical buy price. *(p. 16, 31-32).*

Accordingly, in the embodiment illustrated in Figure 3, the theoretical price look-up table 435 is designed to correlate the current market price of an underlying security to the theoretical buy and sell prices of the options for which automated trading is performed. *(p. 17, 1-3).* For example, if automated trading is performed for options underlying Exxon stock, the theoretical price look-up table correlates the current price of Exxon stock to the theoretical buy and sell prices of Exxon stock options. *(p. 17, 3-6).* If the price of Exxon stock changes, the theoretical price look-up table can be used to index different theoretical prices for the Exxon stock options. *(p. 17, 6-8).*

The automated trading system utilizes a precalculated table of theoretical prices over a range of one or more variables that affect theoretical price. *(p. 18, 17-19).* Accordingly, when a variable affecting theoretical price (such as the market price of the underlying security) changes, the automated trading system references a new theoretical price in the theoretical price look-up table 435 and uses the new theoretical price in taking buy/sell decisions. *(p. 18, 19-22).*

Referring still to Figure 3, decision logic 450 compares the theoretical price identified in the theoretical price look-up table 435 to the market price for the option, and based on the comparison, determines whether the option should be bought or sold. *(p. 18, 30-32).* For example, in an embodiment in which the theoretical look-up table 435 indexes theoretical buy and sell prices for a particular option based on the price of the underlying security, decisions may be triggered (1) when the market price of the underlying security changes, but the market bid and ask prices of the option remain the same (i.e., changing underlying price, static option price), (2) when the bid or ask price of the option changes, but the market price for the underlying security remains the same (i.e., changing option prices, static underlying price), (3) when the values of theoretical price table 435 are updated, (4) when automated trading is enabled for a particular option, and (5) when safety checks are relaxed for a particular option. *(p. 18, 32 – 19, 8).*

Consider example (1) in which the theoretical buy (sell) price of a particular option changes (for example, as a result of a change in underlying security price) and the bid and ask prices of an option remain static. *(p. 19, 9-11).* Decision logic 450 will compare the current market ask (bid) price of the option to the new theoretical buy (sell) price obtained from the theoretical price table 435. *(p. 19, 11-13).* In this case, the decision logic 450 performs all comparisons affected by the change in underlying price. *(p. 19, 13-14).* For example, a change in the bid (ask) price of the underlying security may affect the theoretical buy (sell) price of some or all call options and the theoretical sell (buy) price of some or all put options associated with the underlying security. *(p. 19, 14-16).* Accordingly, the decision logic 450 makes comparisons of market bid or ask prices corresponding to new theoretical sell and buy prices. *(p. 19, 17-18).*

Decision logic 450 determines that a sell (buy) order should be submitted if the market bid (ask) price is greater (less) than or equal to the theoretical sell (buy) price. *(p. 21, 4-5).* Even if decision logic 450 determines that an order should be submitted, safety check logic 460 may be used to prevent an order from being submitted. *(p. 21, 5-7).* Safety check logic 460, for example, can block orders entirely, or put a cap on the maximum quantity attempted to be bought or sold, for an option when acceptance of that order would result in the trader having a position greater than a predetermined threshold quantity of that option. *(p. 21, 7-10).* Also, the automated trading system may be paused or stopped if the number of attempted orders exceeds a predetermined amount in a predetermined period of time. *(p. 21, 10-12).* The constraints may be provided in look-up tables provided to the automated trading system and may be varied for individual options. *(p. 21, 12-13).*

If the safety checks are passed (or overridden), order logic 470 creates an order and submits the order to the exchange site 100 via output interface 480. *(p. 21, 23-24).* The output interface 480 may pass the order to exchange interface software for ultimate transmission to the exchange site 100. *(p. 21, 26-27).* The receiver interface 410 and the output interface 480 may be formed by common equipment and/or data ports. *(p. 21, 27-28).*

6. ISSUES

The sole issue presented on appeal is whether claims 27-46 are unpatentable under 35 U.S.C. § 101 as being directed to nonstatutory subject matter.

7. GROUPINGS OF CLAIMS

Independent claim 27 and its dependent claims 28-31 stand or fall together.

Independent claim 32 and its dependent claims 33-35 stands or fall together.

Independent claim 36 and dependent claims 37-41 and 46 stand or fall together.

Dependent claims 42, 43, 44, and 45 stand or fall separately.

8. ARGUMENTS

The rejection of claims 27-46 under 35 U.S.C. § 101 (hereinafter "Section 101") should be reversed because each of these claims defines subject matter capable of being patented. Claims 27-46 relate to automated methods of trading in an exchange system network. In his rejection under Section 101, the Examiner alleges that claims 27-46 lack "technical basis within the body of the independent claim(s)." *Office Action dated January 28, 2003 at 2.* The Examiner indicates that the rejection under Section 101 would be overcome by including a computer and/or computer structures in the preamble and body of the independent claims. *Office Action dated August 13, 2003 at 2.* Thus, in essence, the Examiner requires that each independent claim recite "a computer and/or computer structure(s)" in the preamble and in the body of the claim in order to satisfy Section 101. The Examiner derives this requirement from the Board's unpublished decision in *Ex parte Bowman, 62 USPQ2d 1669 (BPAI 2001) (unpublished).*

Section 101 does not demand that a process claim recite "a computer and/or computer structure" in the preamble and body, and no authority imposes such a requirement.

I. Claims 27-46 Recite Subject Matter Capable of Being Patented

Section 101 provides that "[w]hoever invents or discovers any new and useful process ..., or any new an useful improvement thereof, may obtain an patent therefor...." While excluding laws of nature, natural phenomena, and abstract ideas from being patented, the courts have interpreted Section 101 expansively. *E.g., Diamond v. Chakrabarty, 447 U.S. 303, 308-309 (1980); Diamond v. Diehr, 450 U.S. 175 (1981).* The Examiner has asserted that claims 27-46 represent the "mere manipulation of abstract ideas," but provides no analysis to support this conclusion. *Office Action dated January 28, 2003 at 2.* Claims 27-46 of the present application

do not define mere abstract ideas. Rather, as discussed in detail below, these claims define a practical process with a concrete, tangible, and useful result, namely a process for automated trading in an electronic exchange.

Independent claim 27, for example, recites the step of "using equipment to perform trading of a first traded item or a second traded item related to the first traded item." Trading is a concrete, useful, and tangible endeavor, as evidenced by the various exchanges throughout the world. Newspapers, the Internet, and radio and television news programs, to name just a few, report the details of trading activities daily. While not every trade is executed on an electronic exchange network, there is no question that trading is not simply an abstract idea.

Claim 27 goes further by reciting the steps of:

> receiving market price information for the first traded item;
>
> identifying a desired price for the first traded item in a look-up table based on price information for the second traded item;
>
> comparing the received market price information for the first traded item to the desired price for the first traded item; and
>
> generating an order for one of the first traded item and the second traded item based on the comparison of the received market price information to the desired price.

The above steps make abundantly clear that claim 27 is not merely an abstract idea, but defines a concrete, useful, and tangible result. Independent claims 32 and 36 are similar and, as such, they also define a concrete, useful, and tangible result. For example, claim 32 recites "using equipment to perform trading of an option" and claim 36 recites "using equipment in a network architecture to perform trading of a first traded item." Accordingly, claims 27-46 each define a process that is more than a mere abstract idea. Each of these claims defines patentable subject matter under Section 101.

II. The Body Portion of Claims 27-46 Include A "Technical Basis"

The Examiner alleges that claims 27-46 lack "technical basis within the body of the independent claim(s)." *Office Action dated January 28, 2003 at 2.* As best understood by Appellants, the Examiner requires something in the body of the independent claims that precludes the recited steps from being performed as mental steps.

Appellants disagree with the Examiner's assertions that the claims lack such a "technical basis." For example, each of the claims 27-46 recite an "automated" method in their preamble. Moreover, each of independent claims 27, 32, and 36 recite a "technical basis" within the body portion of the claims. For example, independent claim 27 recites the steps of "using equipment to perform trading of a first traded item or a second traded item related to the first traded item" and "identifying a desired price for the first traded item in a look-up table based on price information for the second traded item." These steps cannot be performed solely as mental steps as they involve tangible things. Independent claims 32 and 36 include similar recitations. At a minimum, the use of equipment to perform trading and the identification of a price in a look up table provide a technical basis in the body of each of independent claims 27, 32, and 36.

III. *Ex parte Bowman Does Not Require A Process Claim To Recite "A Computer and/or Computer Structure" In The Preamble And Body*

The Examiner apparently requires that a method claim recite "a computer and/or computer structure" in the preamble and in the body of the claim in order to satisfy Section 101. *Office Action dated August 13, 2003 at 2.* The Examiner bases this requirement on the Board's decision in *Ex parte Bowman*, but does not identify any particular support for this requirement in the decision. In fact, the decision in *Bowman* does not impose such a requirement. In *Bowman*, "the disclosed and claimed invention is directed to nothing more than a human making mental computations and manually plotting the results on a paper chart." *Bowman at 1672.* The present

invention, as disclosed and claimed, relates to an "automated trading method," which indicates that the trading activities involve a machine or apparatus, not simply mental computation. Each of the claims recites the step of using "equipment" to perform trading of an option or a traded item. Thus, the facts presented this appeal differ markedly from those before the Board in *Bowman*.

Moreover, no where does *Bowman* support the proposition that method claims must recited "a computer and/or computer structure" in the preamble and body in order to define patentable subject matter under Section 101. In fact, the Examiner's requirement that a process claim recite "a computer and/or computer structure" in the claim's preamble and body is contradicted by the Manual of Patent Examining Procedure ("MPEP"). The MPEP provides an example of a statutory process that does not recite "a computer and/or computer structure" in the preamble or the body of the claim:

> A digital filtering process for removing noise from a digital signal comprising the steps of calculating a mathematical algorithm to produce a correction signal and subtracting the correction signal from the digital signal to remove the noise. *MPEP at § 2106, IV.B.2(b)(ii).*

According to the Examiner's reasoning, the claim recited above would not define statutory subject matter under Section 101 because the example claim does not recite a computer or computer structure anywhere in the preamble or in the body. Notwithstanding, the MPEP notes that the example claim recites patentable subject matter under Section 101. *Id.* At least for these reasons, the rejection of claims 27-46 under Section 101 should be reversed.

Finally, even under the Examiner's narrow interpretation of Section 101, claims 42-45 define patentable subject matter. Each of these claims specifically recite a computer. Thus, even

if it were held that a process claim must recite "a computer", claims 42-45 recite a computer and therefore should be deemed patentable.

CONCLUSION

In view of the foregoing, Appellants respectfully request the reversal of the Examiner's rejections and allowance of the pending claims 27-46. If there are any other fees due in connection with the filing of this Brief, please charge the fees to our Deposit Account No. 50-0310. If a fee is required for an extension of time under 37 C.F.R. § 1.136 not accounted for above, such an extension is requested and the fee should also be charged to our deposit account.

Respectfully submitted,

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9. APPENDICES

APPENDIX A provides appealed claims ordered by number.

APPENDIX A - CLAIMS ORDERED BY NUMBER

Claim 27. An automated trading method for use in an electronic exchange system network, comprising:

using equipment to perform trading of a first traded item or a second traded item related to the first traded item, including:

receiving market price information for the first traded item;

identifying a desired price for the first traded item in a look-up table based on price information for the second traded item;

comparing the received market price information for the first traded item to the desired price for the first traded item; and

generating an order for one of the first traded item and the second traded item based on the comparison of the received market price information to the desired price.

Claim 28. The automated trading method according to claim 27, wherein said first traded item corresponds to an option and the second traded item corresponds to a security underlying the option.

Claim 29. The automated trading method according to claim 27, wherein said step of identifying a desired price, comprises:

(a) receiving current market price information for said second traded item;

(b) using said current market price information for said second traded item to index a desired price for said first traded item in said look-up table.

Claim 30. The automated trading method according to claim 27, wherein said look-up table comprises a two-dimensional table providing desired price values indexed by item traded and price of the second traded item.

Claim 31. The automated trading method according to claim 27, wherein said look-up table comprises an n-dimensional table, where n is 3 or more.

Claim 32. An automated method of trading in an exchange system network, comprising:

using equipment to perform trading of an option, including:

receiving a current market price for the option from an exchange;

comparing the current market price for the option with a desired price for the option, said desired price derived from current price information for an underlying security for the option; and

submitting an order for the option to the exchange within 1 millisecond of the step of receiving the current market price.

Claim 33. The automated trading method according to claim 32, wherein said step of submitting an order is performed within 600 microseconds of the step of receiving the current market price.

Claim 34. The automated trading method according to claim 33, wherein said step of submitting an order is performed within 380 microseconds of the step of receiving the current market price.

Claim 35. The automated trading method according to claim 34, wherein said step of submitting an order is performed within 250 microseconds of the step of receiving the current market price.

Claim 36. An automated trading method for use in an exchange system network, comprising:

using equipment in a network architecture to perform trading of a first traded item, including:

receiving market information for the first traded item;

identifying a transaction value for the first traded item in a look-up table

of transaction values for the first traded item, wherein the identifying is responsive to receiving the market information for the first traded item and wherein the transaction values in the look-up table are based on price information for a second traded item related to the first traded item; and

using at least the identified transaction value in determining whether to submit an order for the first traded item.

Claim 37. The automated trading method according to claim 36, wherein the identified transaction value is a volatility value corresponding to the first traded item.

Claim 38. The automated trading method according to claim 36, wherein the identified transaction value is a maximum buy value for the first traded item.

Claim 39. The automated trading method according to claim 36, wherein the identified transaction value is a minimum sell value for the first traded item.

Claim 40. The automated trading method according to claim 36, wherein the identified transaction value is a theoretical value for the first traded item generated based on a mathematical model.

Claim 41. The automated trading method according to claim 36, wherein the look-up table comprises a linked list.

Claim 42. The automated trading method according to claim 36, wherein a backend computer performs the receiving, identifying, and using steps on a Windows-based operating system.

Claim 43. The automated trading method according to claim 36, wherein a backend computer performs the receiving, identifying, and using steps on a text-based platform.

Claim 44. The automated trading method according to claim 36, wherein:

(a) a backend computer performs the receiving, identifying, and using steps,

(b) a trader station separate from said backend computer calculates transaction values for storage in the look-up table and transmits the calculated transaction values to the backend computer, and

(c) the backend computer stores the calculated transaction values in the look-up table.

Claim 45. The automated trading method according to claim 44, further comprising the steps of checking values stored in the look-up table of the backend computer with values stored in a look-up table in said trader station to confirm the accuracy of the look-up table stored in the backend computer.

Claim 46. The automated trading method according to claim 36, further comprising the steps of:

(a) submitting an order for the first traded item;

(b) receiving confirmation of a transaction from an exchange responsive to the order submitted; and

(c) submitting an order for the second traded item to hedge a delta risk associated with the confirmed transaction.